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PROCEEDINGS

OF

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

SESSION 1858.

Tenth Meeting, Monday, April 12th, 1858.

SIR RODERICK I. MURCHISON, PRESIDENT, in the Chair.

PRESENTATIONS. — *The Rev. J. W. Hammond, and T. Fowell Buxton, L. P. Casella, and Robert M'Kerrell, Esqrs., were presented upon their election.*

ELECTIONS.—*Dr. Adolphus Bernays; Sir Robert Peel, Bart.,* M.P.; *Dr. John Shea,* R.N.; *Viscount Strangford; the Right Hon. John Wynne,* M.P.; *and John Francis Champion; Charles Hutton Gregory,* C.E.; *Morrell Dorrington Longden; and George William Wheatley, Esqrs.; were elected Fellows.*

The Paper read was :—

On the supposed Discovery of the North Coast of Greenland and an Open Polar Sea; the great "Humboldt Glacier," and other matters relating to the formation of Ice in Greenland, as described in 'Arctic Explorations in the Years 1853–4–5, *by* ELISHA KENT KANE, U.S.N. *Philadelphia,* 1856.' By DR. HENRY RINK, M.D., of Copenhagen.

IT will be recollected that Dr. Kane attempted to take his ship farther to the northward on the track discovered by Captain Inglefield the preceding year; that he did so, to a short distance; that he was frozen in and lost his ship, and finally saved himself and party by returning in sledges to Uppernavik. During his two years' stay in Smith Sound, he made various sledge excursions; and his discoveries, when engaged in these, must be regarded as the chief profit of the expedition. These discoveries are, 1st, The great Humboldt Glacier, which he describes in most eloquent terms, as the glacial outpouring of that vast ice-field, little less in extent than the whole of Australia, which forms the interior of Greenland; and, 2ndly, The north coast of Greenland and the Polar Sea, which washes its shores, and which is kept open by the Gulf Stream. As to the first point, Dr. Rink denies the existence of any evidence by which we can speculate on the nature of the interior of Greenland; it may consist of mountain chains, which protrude through the ice, for aught that is known about it. He considers that Humboldt Glacier is but one of the many glaciers which run down into every fiord along the coast, none of which Dr. Kane had had an opportunity of examining, but in the investigation of which Dr. Rink has been actively employed for eight years. He does not even find cause to believe that Humboldt Glacier discharges any large part of the whole amount of ice which moves down from Greenland to the sea, but that the direction of greatest discharge is elsewhere (Jakob Haven, &c.); at all events, data are entirely wanting for estimating either the absolute or the relative amount of discharge of ice from Humboldt Glacier. Dr. Kane describes the formation of icebergs under an hypothesis, apparently offered as his own, of the glaciers moving down along the sea bottom, and from time to time breaking up and floating to the surface. Dr. Rink expresses surprise at Kane's ignorance of his own similar hypothesis, which has been published in many forms, and ought naturally to be familiar to Arctic explorers. As regards the second discovery, that of the northern coast of Greenland and the open Polar Sea, it appears that the entire story rests upon the assertions of Morton the steward, and of Hans, the Greenlander. These two men made a sledge expedition to a distance of three days' journey from camp, but a critical examination into their proceedings during those days leads Dr. Rink to throw great doubt on the value of their observations, as related and mapped out by Dr. Kane. If we are to credit their accuracy, we must be prepared to believe that they laid down more than 20 points of longitude and latitude during their toilsome journey, besides fixing numerous positions on the opposite coast, which Morton maps out in a detailed manner, although he never approached nearer to it than from 25 to 40 miles. Their itinerary is as follows: the first day's journey takes them beyond the face of Humboldt Glacier to open water, flowing with a strong current; the next day's journey is only 6 miles; on the third day they have a very rugged way to travel over, and are detained by hunting, killing, and cooking a bear. A high promontory is before them, which they have not strength to reach; and ultimately they stop at the foot of a "knob," stated by Morton to be 500 feet high, but upon what grounds it does not appear. He ascends this knob, and from its top professes to obtain a view for 36 miles, over a sea entirely free from ice; but we are left entirely in the dark as to the extent of the field of view which is left clear by the promontory. Morton sees a mountain to the northward, which he lays down at the enormous distance of 100 miles from the point where he stood, and yet he remarks on the barrenness of its top and on the streaks and ledges upon its face. He sees crowds of waterfowl, and Hans observes some plants, but brings back no specimens, although they are named in scientific phraseology in Kane's work. Dr. Rink joins issue on nearly every one of the data and theories based upon Morton's journey. He considers it out of the question that a man, looking out from an elevation of 500 feet, could determine the absence of floating ice at a distance of 36 miles. He also throws great doubt upon the probability of Morton's point of view being as high as he states it to be, for he believes that he identifies it with a hill whose measurement is very variously reckoned by Kane at pages 299, 305, and 307. He argues that the absence of drift ice tends to prove that the sea was permanently frozen to the northward, whence the wind was blowing strongly, and that the vast number of birds go to prove the smallness and not the greatness of the water at which they congregated; and, finally, that there is nothing remarkable in the discovery of a sheet of open water, in midsummer, only 90 miles to northward of where a ship was sailing the preceding year. The picture in Dr. Kane's work of the open sea, with Morton in the foreground, will not (says Dr. Rink) bear criticism. The sun is represented as half bathed in the water, although, at that season of the year and latitude, it must be far above the horizon.

The President.—In returning thanks to Dr. Rink for this communication, I may remind you that the author is a distinguished Dane, who has spent nine years of his life in studying the natural phenomena of the great continent of Greenland. You have all doubtless admired, as much as I have, the work of that great American explorer, Dr. Kane; and I am sure there is not one present who would not be as sorry as myself to derogate in any degree from his real merit, and from that glory which he really attained for himself by his most adventurous voyage. This is simply a critical essay respecting two points of Kane's voyage, the first touching the formation and movement of glaciers, the other as respects the proceedings of Morton, the steward of Kane's ship; and as I see here present two eminent Polar voyagers, I know they are the persons best qualified to speak on this occasion. In the mean time Mr. Arrowsmith has defined on the map the position which he and others who have gone into the question assume to be the ultimate point which may be relied upon, as having been reached by any one of the persons who served under Dr. Kane.

Rear-Admiral Sir George Back, Vice-President.—I think it is the fate of nearly all voyagers and travellers to undergo the ordeal of criticism from other travellers; and, however interesting their accounts may be in other respects, yet, if their observations are not correct, I need not say that they deteriorate in a geographical point of view from the value of their narratives. In making this observation, it will not be supposed for one moment that I cast the most distant reflection upon the memory of that gallant American, Dr. Kane. Nobody could have done better than he did. Few, if any, have undergone greater trials. I would observe that there is not the slightest idea of any concealment in his book. He states clearly the observations which he got from Morton, especially the meridional observations, which are always most desirable, and which formed one of the bases upon which he founded his map. He added to that, another mode of calculation called the dead-reckoning ; but unhappily, it was an incorrect dead-reckoning, and there was the error. Now if he had done what I am certain Professor Bache or Lieut. Maury would have done—taken the observation of the latitude of the day, and added the difference of latitude of the distance travelled from that point correctly—that difference, added to the latitude, would give the precise point which should be put down for the extreme to which Morton went. That would be the correct latitude. Now, although it may appear to many of us, and particularly to those who are not practical geographers, that a few miles more or less can make no difference in a great and perilous undertaking of this kind—accomplished as it was in such a persevering and gallant manner—yet there is one little national point of view in which it is of some importance. By making this deduction it would then appear that the British flag was unfurled farther north than any other. But, if the correction be omitted, and the error be allowed to remain, then the American flag has an unquestionable claim to the honour. That, I believe, is the chief point. As regards the glaciers, I shall not enter into their theory, because it would occupy too much of our time, and Dr. Rink, who is really an authority upon the subject, has passed eight or nine years of his life in investigating the laws of glaciers. He tells you that, at the elevation of 2000 feet—the level of continual snow—they rise in plateaus one above the other ; twenty-three of which plateaus he counted. That the ice is forced gradually down in one vast mass, following the sinuosities of the valleys to the fiords, and, having a thickness of at least 1000 feet, still glides along the uneven bottom until it is acted upon by the water, and, struggling to rise, is at last liberated by the action of the swell, when vast masses are broken off and detached. Those masses form icebergs, and they are known in many instances to attain a height of from 150 to 200 feet, and even more ; sometimes, indeed, they are fully a mile in length. I think there can be no doubt of that, as Dr. Rink has seen them with his own eyes. A little incident fell under my own observation at Spitzbergen. With my friend Sir John Franklin, and in a boat commanded by the late Admiral Beechey, we were going past a glacier at the distance of perhaps half a mile with a party of men prepared for a survey ; a flight of eider ducks passed by, and one of the officers thoughtlessly fired his gun ; the concussion of this acted on the iceberg and brought down a huge mass. We looked with some interest at it, but without any alarm, for there was a low point of land between us and the iceberg. The mass was submerged for a short time, but soon rose again, and then sent a wave to the opposite shore, perhaps a mile and a half distant. The return of that wave struck the launch in which we were, lifted her up, and threw her high and dry on the beach and upset us. I merely state this to show that there are other reasons besides those mentioned by Dr. Rink, for the appearance of small icebergs, though doubtless he must have seen many similar effects. The learned Doctor says that the ice calved—that it rises from below, which in fact, it generally does, but in this instance such was not the case. Again, Dr. Rink speaks about the open sea in the vicinity of ice : now that is a very delicate question to enter into, and on this occasion I am not prepared to do so ; but I can speak of some of the stream-holes, or open spaces of water, which do occasionally form in the ice. I may mention an almost ludicrous circumstance that occurred when I commanded H.M.S. *Terror*. Surrounded by ice in the frozen straits off Southampton Island, with not a particle of water to be seen, and the ship in some danger, in the course of an hour a pool of water opened out, perhaps some 30 feet in diameter. Within an hour or an hour and a half afterwards, that pool was more or less covered with birds of the gull species, and even large narwals came up to breathe there. I may mention that it was Sunday afternoon when a sturdy British sailor betook himself to the side of this open water, and as he said formed a quarter-deck there, and began to think of his wife and children. While he was thus lost in contemplation, a huge walrus rose up within a few feet of him, and so frightened the boatswain, who had never seen one before, that he ran on board and swore he had seen the devil. I only state this as one of many instances to show that wherever there is an open stream-hole, animals and birds invariably flock to it. As to the land which is said to have been seen, I may simply state what you have already heard—that Morton, who was the steward of the ship, seems to have been singularly qualified above all stewards that I ever heard of; inasmuch as he knew how to make observations and other nice calculations, seldom found except in men of superior attainments. Be that as it may, I give him full credit for his knowledge. He says he ascended a hill 500 feet high. Now it is not very difficult to calculate at what distance the land might be seen from that height; but as my friend Captain Collinson has something to tell you on this subject, I leave the explanation to him.

CAPTAIN R. COLLINSON, R.N., F.R.G.S.—I think it very fortunate with yourself, Mr. President, that on this occasion we are acting the part of mediators, and not accusers, and that it has fallen to a Dane, and not to an Englishman, to write this criticism. But I feel assured that we all ever shall acknowledge the debt of gratitude which we owe to the noble individual who made this voyage. It appears to me that we have nearly exhausted all that can be said upon the subject. There are certainly one or two points which require attention. One point which I would advert to is that the existence of the Humboldt Glacier gives a colour to the theory of an open sea, because we never could have a *mer de glace* without great change of temperature. If it were perfectly cold there during the whole season the snow would remain snow as it drifted, but there must be a change of temperature to turn it into ice. I think that is one reason why we may place faith in Morton's account of there being open water. Still I will say this, that as far as my experience goes, it is almost impossible that it could be open water throughout the whole of the year, because I am sure it would have affected the temperature which Dr. Kane experienced at his winter quarters; so that I look upon it as a temporary opening, or water-hole. And I must add that I think Morton is mistaken in his statement with regard to the current. I cannot conceive it possible that a tide should run to and fro at the rate of four knots an hour, the liquid being from 7 to 11 degrees above freezing point, without sweeping the ice out of Peabody Bay and rendering Smith Sound entirely free up to Kennedy Channel. This must only be looked upon as a remark on my part, that possibly Morton may be in error with regard to the current. But there is one other point also I think it right to allude to, for the sake of meteorologists, in which I believe Dr. Kane is mistaken. In his series of observations for temperature he has taken the mean of his thermometers. Now the thermometers supplied to the former expedition were essentially bad. I had not one that registered the freezing point of mercury within 12 degrees. Dr. Kane has taken the mean of these thermometers. In the course of all our observations we corrected each thermometer by the freezing point of mercury, so that in the case of Dr. Kane's temperatures being compared with ours, there is the necessity of a correction. I will now refer to the *vexata quæstio:* that is—the extent to which Morton really got. Dr. Kane tells us that these positions are the mean of the uncorrected dead reckonings. As geographers, we cannot accept that; we must stick to observations. What the sun tells us, is more convincing than what we suppose we have gained. By way of elucidating how extremely Morton's reckoning got the better of his judgment, I would just remark that at Cape Maddison he left his sledge and set off for Cape Jefferson. From Cape Maddison to Cape Jefferson is 34½ miles, as the crow flies. From Cape Jefferson to Cape Constitution, his farthest point, is another 27 miles: that makes 61½ miles which he travelled in a straight line; double that (for he came back), and that makes 123 miles; and I think the least we can give him for sinuosities is one-third more, which will make 167 miles. That is to say, he travelled 167 miles in 36 hours; so I believe we are quite justified in having recourse to his observations, and rejecting his reckonings altogether. I believe we shall have to bring Cape Constitution, as far as I can understand, 35 to 45 miles farther south, and the effect of bringing that cape down, will also have the effect of narrowing this channel. I cannot conclude without paying what I think to be a just tribute to the man who commanded on this occasion, and expressing my opinion, how fortunate it is that such a man was there to command, one who could not only persevere in the way he did, but who set himself studiously to work to collect every observation that would bear upon geographical discovery. However we may analyse his theories, or dispute his conclusions, or doubt his geographical positions, yet, as the British nation, we shall never cease to respect with admiration and esteem that noble spirit who went forth at the peril of his life without the tie of kindred or nation to succour our fellow countrymen.

DR. A. ARMSTRONG, R.N., F.R.G.S.—I fully agree with the observations which have been made by Captain Collinson. I beg, however, very briefly to direct the attention of the Society to a circumstance which has not been alluded to in the course of this discussion. It appears to me that nothing new has been advanced by Dr. Kane with regard to the existence of water where he is supposed to have seen it. If we refer as far back as 1827 to Parry's memorable attempt to reach the North Pole, we find that he met with water as high as 82°. It is not improbable that water may have been seen by Dr. Kane's party, but not to an extent that would establish the existence of a Polar sea. If you look to the chart, you will find that the outlet between the eastern coast of Greenland and the western coast of Norway affords greater facilities for the escape of ice than any other part of the Polar Sea. With the prevailing winds you may find the Polar Sea always clear of ice in that part; during the navigable season therefore it is nothing extraordinary to find open water as stated. Off the northern coast of Banks Land, we (in the *Investigator*) saw a space of open water, and we might have supposed, on evidence quite as conclusive, that we saw an open sea extending from that point right to the Pole, had we not been previously aware that Melville Island was in the same meridian. An officer whose observations were generally accurate estimated the extent of water seen at 11 miles, which I think a very close approximation to the truth. Ice was of course beyond it, but owing to the prevalence of the S.W. winds it had been driven off the shore. An observer in that direction would have come to the same conclusion that Dr. Kane did, that the sea extended to the Pole, had he not been aware of the existence of Melville Island. I may also state that in the *Investigator* we found open water extending no less than 90 miles to the northward, off the mouth of the Mackenzie River; but were ultimately arrested by an impenetrable ice pack. Had we therefore not sailed through this space of open water until our progress was arrested by the ice, we might with equal or indeed greater probability have stated our opinion that we had discovered the great Polar Basin. Before I sit down I wish to express the admiration that I have always entertained for the zeal and enthusiasm with which Dr. Kane pursued that voyage. But I must reserve to myself the right to criticise the judgment which he exercised in many respects. I must therefore state my conviction that this much talked of Polar Sea or Basin, as it is sometimes called, has no existence except in the vivid imagination of those who feel disposed to portray it; and I have almost universally remarked that the advocates for its existence are those who are least capable of forming an opinion on the subject, from never having been in the Polar Sea. From the analogous cases I have mentioned, therefore, and numerous others which may be found in the records of Polar voyaging, we must, I think, arrive at the conclusion that the opinion advanced by the enterprising and lamented Kane is not supported by evidence sufficiently trustworthy or conclusive to establish the fact, and we must consequently ignore the existence of an open Polar Sea in the position indicated.

The President, in concluding the discussion and in complimenting the gallant officers who had spoken on the ability they had shown, expressed the gratification he had experienced, in common, he was sure, with all present, in perceiving that nothing had been said which could in any way affect the noble character and high merits of Dr. Kane; for it was chiefly the account given by Morton as to the extent of his rapid excursion northwards which had been called in question. Again, as respected the formation of the Greenland glaciers, Dr. Rink, who had studied them for several years *in situ*, had long ago published his views upon that subject.

In answer to a question from the Chair—

Sir George Back said—I hardly know how to answer that question, because Dr. Rink, in speaking of the Humboldt Glacier, does not throw any doubt upon its formation, or the similarity of its formation to any of the glaciers in Omenak Bay. I think his idea is, that it does not extend 1200 miles, or as Dr. Kane supposed from where he saw it to Cape Farewell. He gives it as his opinion that the glaciers inside first fill up the valleys, gradually accumulate until they cover the hilltops, and then form plateaus; but with eight or nine years' experience, it appears he was unable to ascertain their extent.

Eleventh Meeting, Monday, April 26th, 1858.

Sir RODERICK I. MURCHISON, President, in the Chair.

Presentations.—*The Right Hon. John Wynne,* m.p., *and Dr. John Shea,* r.n., *were presented upon their election.*

Elections.—*Major-General Duncan Alexander Cameron,* c.b.; *the Hon. Henry Coke; Captain J. Somerfield Hawkins,* r.e.; *the Ven. Archdeacon, Hugh Willoughby Jermyn; Dr. John Lister; and J. N. Fazakerley; John Robert Godley, Assistant Under-Secretary of the War-Office; Thomas Guisford; and George Stoddart, H. M. Consul at Madeira, Esqrs., were elected Fellows.*

Announcement.—It was announced that Captain Irminger, of the Royal Danish Navy, had written to state that letters addressed to Captain M'Clintock, and the officers and crew of the Arctic expedition, might be forwarded to Greenland viâ Copenhagen.

The Paper read was:—

On the Importance of opening the Navigation of the Yang-tse-Kiang, and the Changes that have lately taken place in the Bed of the Yellow River, &c.

By William Lockhart, Esq., f.r.g.s.

Mr. Lockhart's paper has been compiled from various sources, free use having been made of Biot's description of the cities of China